

### **REMARKS - General**

By the above amendment, applicant has amended the title to emphasize the novelty of the invention.

Applicant has also amended the claims from 1-9 and rewritten other claims from 10-23 to define the invention more particularly and distinctly so as to overcome the technical objections and rejections and define the invention patentably over the prior art references.

#### **The Objection To The Claims Objections**

The claims were objected because of the following informalities including the acronyms and the word “mutlcarrier” in the claims.

Applicant has amended the claims from 1-9 and rewritten other claims from 10-23 to spell out all acronyms and correct the wrong word “mutlcarrier” to the word “multicarrier” in all of the claims. Accordingly, applicant submits that all of the claims do comply with the examiner’s requirements and therefore requests reconsideration and withdrawal of the objections.

#### **The Objection To The Claims Rejections Under USC 101**

The claims 10-13 were rejected under Section 101 because the claim 10 of the “multi-carrier comprising” is inoperative and therefore lacks utility. The multi-carrier signal is not either an apparatus or a method and has no means for comprising.

Applicant has rewritten the claims 10-13 to provide sufficient basis for operation and utility. Accordingly, applicant submits that the claims 10-13 do comply with the Section 101 and therefore requests reconsideration and withdrawal of this objection.

#### **The Objection To The Claims Rejection Under 35 USC 112**

The claims 14-17 were objected to under Section 112 because of unclear as to what the “same sampling frequency rate and same resolution bit” is in reference to, leading to the question “same as what?” The claims 18-23 were objected to under Section

112 because of insufficient antecedent basis for the limitation such as “the indoor UWB, outdoor UWB” and “the no multicarrier” in the claims.

Applicant has rewritten the claims 14-17 to specify the sampling frequency rate and resolution bit and eliminated the word “same ” in the claims 14-17. Applicant has also rewritten the claims 18-23 to provide sufficient antecedent basis for the limitation in the claims 18-23. Accordingly, applicant submits that the claims 14-23 do comply with the Section 112 and therefore requests reconsideration and withdrawal of this objection.

**The Rejection Claims 10 and 13 on Graves et al. (US Patent Application 2002/0114035) in View of Uesugi (US Patent Application 2002/0159502) Under 35 USC 103(a) as Being Unpatentable Are Overcome**

The office action rejected the independent claim 10 and the dependent claim 13 on the Graves, et al. Patent Application and Uesugi Patent Application. The independent claim 10 and dependent claim 13 have been rewritten as new independent claim 24 and new dependent claim 27. All the new claims 24 and 27 are to emphasize the novelty of the invention and to define patentably over these prior-art references, and/or any combination thereof. Applicant requests reconsideration of these rejections, as now applicable to the new independent claim 24 and the new dependent claims 27, for the following reasons:

- (1) There are no justification, in Graves, et al., and Uesugi, or in any other prior art separate from applicant’s disclosure, which suggests that these references be individual or be combination way in the manner proposed.
- (2) Even if Graves et al., and Uesugi were to be combined in the manner proposed, the proposed combination would not show all the novel physical feature of the claims 24 and 27.
- (3) These novel physical features of the new independent claim 24 and the new dependent claim 27 produce new and unexpected results in such a way that proposed dual-mode ultra wideband and wireless local area network communications completely operates in the different methods and deals with the different signals that Graves et al., and Uesugi or any other prior art

suggested, and therefore are novelty, unobvious and patentable over these prior-art references.

### **The References And Differences Of The Present Invention Thereover**

Prior to discussing the claims and the above three points, applicant will first discuss the prior-art references and the general novelty of the present invention and its unobviousness over these prior-art references.

**Present Invention** - The present invention is dual-mode ultra wideband (UWB) and wireless local area network (WLAN) communications. A dual-mode UWB and WLAN communication transceiver is used to implement two disparate systems of UWB and WLAN communications within a single communication device. An UWB communication system operates in the frequency band from 3.1 GHz to 10.6 GHz while a WLAN communication system is aimed for the lower band from 5.15 GHz to 5.35 GHz and the upper band from 5.725 GHz to 5.825 GHz. During the UWB operation mode, the dual-mode UWB and WLAN communication transceiver sends and receives the UWB signal at very-high data rate with a relative short transmission range. During the WLAN operation mode, the dual-mode UWB and WLAN communication transceiver sends and receives the WLAN signal at a relative low data rate, but with a longer transmission range. Thus, the dual-mode UWB and WLAN communication transceiver can obtain mutual benefits from either UWB or WLAN, thereby enhancing performance on the transmission data rates with different transmission ranges for the seamless wireless broadband communications.

Note that the present invention of the dual-mode UWB and WLAN communications includes a dual-mode multichannel-based multi-carrier modulation system according to some embodiments as shown in FIG. 6. The dual-mode multichannel-based multi-carrier modulation system is used to provide selectable multicarrier for both UWB and WLAN transmitters in the single communication device.

The present invention of showing the dual-mode multichannel-based multi-carrier modulation system in FIG. 6 uses a D/A converter 222 coupled to an analog lowpass filter 610 in which is connected with a mixer 612. The mixer 612, which is used to multiply a carrier frequency from either UWB or WLAN for the dual-mode UWB and WLAN transmitter, is connected with a power amplifier (PA) 226. There are three multicarrier frequencies including units of UWB selectable multicarrier frequencies 620, WLAN lower-band selectable multicarrier frequencies 632, and WLAN upper-band selectable multicarrier frequencies 634. The UWB selectable multicarrier frequencies 620 contains 11 carrier frequencies while the WLAN lower-band selectable multicarrier frequencies 632 and the WLAN upper-band selectable multicarrier frequencies 634 include 8 and 4 carrier frequencies, respectively. The UWB selectable multicarrier frequencies 620 is coupled to a UWB commutator unit 616 in which has a switch 618. The switch 618 that is controlled by using a software control unit 228 is used to select one of the 11 carrier frequencies within the UWB selectable multicarrier frequencies 620. On the other hand, the WLAN lower-band selectable multicarrier frequencies 632 is coupled to a WLAN lower-band commutator unit 624 in which contains a switch 626. The switch 626 selects one of the 8 carrier frequencies within the WLAN lower-band selectable multicarrier frequencies 632. The WLAN upper-band selectable multicarrier frequencies 634 is coupled to a WLAN upper-band commutator unit 628 in which contains a switch 630. The switch 630 can select one of the 4 carrier frequencies within the WLAN upper-band selectable multicarrier frequencies 634. The outputs of the WLAN lower-band commutator unit 624 and WLAN upper-band commutator unit 628 are connected with a MUX 622. The outputs of the MUX 622 and the UWB commutator unit 616 are connected with a MUX 614, which is coupled to the mixer 612. The software control unit 228 is used to control all of the switches 618, 626 and 630, and all of the MUX units 614 and 622 to determine a carrier frequency for the mixer 612.

Further note that the dual-mode multichannel-based multi-carrier modulation system in FIG. 6 is invented in a novelty way in which switch 618 can be used to form frequency hopping tones to map the UWB signals into different multiband at different frequencies by using the software control unit 228.

Graves, et al. presented a connection verification system 330 (Fig. 3, Pg. 4, col. 2, lines 27-34) being determined by one or more low-pass electrical filters, but the one or more low-pass electrical filters are used to set a coarse upper bound on the bandwidth of the resulting signal in which is used for correlation purposes. Graves, et al presented multiplexing and demultiplexing that are a plurality of wavelength division multiplexing and demultiplexing for optical signals. In addition, each of the receivers 430 (Fig. 4) is operable to convert the corresponding incoming single-carrier optical signal into a band-limited electrical signal. Thus, all of the receivers 430 are not the commuter units in which the present invention described. Graves, et al also presented a photonic switch 100 comprises a switching core that includes a plurality of optical switch matrices 110A, ..., 110M (Fig. 1, Pg. 3, col. 1, line 11-16). Note that each of the optical switch matrices 110A, ..., 110M has a total of  $N+K$  input ports and  $N+K$  output ports. For a given one of the optical switch matrices 110A, ..., 110M, each of  $N$  input ports is connected to the like-wavelength output port of a respective one of the WDD devices 130A, ..., 130N, while the remaining  $K$  input ports are connected to output ports of the wavelength converting switch 120.

Note that applicant's invention presents the dual-mode UWB and WLAN communications in which includes a dual-mode multichannel-based multi-carrier modulation system as shown in FIG. 6 according to some embodiments. The dual-mode multichannel-based multi-carrier modulation system consists of the D/A converter coupled to the analog lowpass filter in which is connected with the mixer, where the mixer is connected to the PA. Thus, goal of the analog lowpass filter in the present invention is different from Graves, et al.'s analog lowpass filter in which is used for correlation purposes. The dual-mode multichannel-based multi-carrier modulation system also contains the UWB selectable multicarrier frequencies unit, the WLAN lower-band selectable multicarrier frequencies unit, the WLAN upper-band selectable multicarrier frequencies unit, the UWB commuter unit, the WLAN lower-band commuter unit, the WLAN upper-band commuter unit, two MUX units, and the software control unit. The MUX units of the present invention that are used to select one of two input signals are different from what Graves, et al's MUX units in which are the plurality of wavelength

division multiplexing for optical signals. The UWB and WLAN commutator units of the present invention that contain switches to select one of the carrier frequencies are completely different from what Graves, et al's "three commutator units" in which are the optical receivers to convert the corresponding incoming single-carrier optical signal into a band-limited electrical signal. Thus, Graves, et al does not present any commutator units. Furthermore, the switches of the present invention in which are single input and single output devices are completely different from what Graves, et al's switch matrices that are optical switches with multiple inputs. Therefore, applicant's invention of using the dual-mode multichannel-based multi-carrier modulation system in the dual-mode UWB and WLAN communications is completely different from what **Graves, et al.** used the analog lowpass filter, MUX units, optical converters, and optical switches.

**Uesugi et al.** presented a multiplier (Fig. 6 (412, 416)) in which is used to mix output signals from modulators rather than to shift signal in the frequency with a carrier. Uesugi, et al. also presented two frequency selections (Fig. 6 and 7 (511-514), Pg. 5, col. 1, lines 24-32 and lines 35-37) that are coupled to filters and modulators directly, respectively, rather than that are coupled to a mixer to shift signal in the frequency domain.

Note that applicant's invention presents the dual-mode multichannel-based multi-carrier modulation system in which consists of the D/A converter coupled to the analog lowpass filter in which is connected with the mixer, where the mixer is connected to the PA. Further note that applicant's invention presented the mixer that is used to shift the output signal from the analog lowpass filter with a carrier in the frequency domain. The mixer is also connected to the PA. In addition, applicant's invention presents UWB selectable multicarrier frequencies unit, the WLAN lower-band selectable multicarrier frequencies unit, the WLAN upper-band selectable multicarrier frequencies unit through their respective commutator units in which contain switches to connect with the mixer. As a result, applicant's invention of the dual-mode multichannel-based multi-carrier modulation system is to achieve the transmission signals with multi-carrier for the dual-mode transmitter, which is completely different from the multiplier and the selectable multicarrier frequencies in **Uesugi, et al.** patent application.

In summary, Graves, et al., and Uesugi are arts but they are different from each other. Graves, et al. presented the art on connection verification for optical switches while Uesugi presented the art on data transmitting apparatus and data transmitting method. Graves's patent application used for the optical switch operation and Uesugi's patent application used for transmitting data between mobile and mobile station. They are all single-mode operation. Applicant's invention is the dual-mode UWB and WLAN communications within the single communication device, which is used to implement two disparate systems of UWB and WLAN transceivers. The UWB communication system operates in the frequency band from 3.1 GHz to 10.6 GHz while the WLAN communication system operates in the frequency bands from 5.15 GHz to 5.35 GHz and from 5.725 GHz to 5.825 GHz. Thus, applicant's invention of the dual-mode UWB and WLAN communications is truly novel structure to obtain mutual benefits both from UWB and WLAN, thereby enhancing performance not only on the transmission data rates but also on transmission ranges for the seamless wireless broadband communications. Therefore, the dual-mode UWB and WLAN communications is fundamentally different from the Graves, et al., and Uesugi's systems or any combination thereof. As a result, it is impossible and unobvious to one having ordinary skill in the art to develop the dual-mode UWB and WLAN communications even given Graves, et al., and Uesugi's prior-art references.

**Graves, et al., and Uesugi Do Not Contain Any Justification To Support Individual or Their Combination, Much Less In The Manner Proposed**

With regard to the individual invention of Graves, et al, and Uesugi, it has been shown that there are fundamentally differences between applicant's invention and the individual invention of Graves, et al., and Uesugi as applicant discussed above. Therefore, it is invalid to use any prior-art references to reject applicant's invention under the Sections 102 and 103.

With regard to any combination of Graves, et al., and Uesugi's prior art references, it is well known that in order to for any prior-art references themselves to be validly combined for use in a prior-art rejection of the Section 103, the reference themselves (or

some other prior art) must suggest that they be combined, e.g., as was stated in In re Sernaker, 217 U.S.P.Q. 1.6 (C.A.F.C. 1983):

“Prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teaching.”

That the suggestion to combine the references should not come from applicant was forcefully stated on Orthopedic Equipment Co. v. United States, 217 U.S.P.Q. 193, 199 (CAFC 1983):

“It is wrong to use the patent in suit [here the patent application] as a guide through the maze of prior art references, combining the right references in the right way to achieve the result of the claims in suit [here the claims pending]. Monday morning quarterbacking is quite improper when resolving the question of nonobviousness in a court of law [here the PTO].”

As was further stated in Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434 (C.A.F.C. 1988):

“[w]here prior-art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. . . . Something in the prior art must suggest the desirability and thus the obviousness of making the combination.” [Emphasis supplied]

In line with these decisions, recently the Board stated in Ex parte Levengood, 28 U.S.P.Q.2d 1300 (P.T.O.B.A.&I, 1993):

“In order to establish a prima facie case of obviousness, it is necessary for the examiner to present evidence, preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner



to arrive at the claimed invention, ... That which is within the capabilities of one skilled in the art is not synonymous with obviousness. ... That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention .... Our reviewing courts have often advised the Patent and Trademark Office that it can satisfy the burden of establishing a prima facie case of obviousness only by showing some objective teaching in either the prior art, or knowledge generally available to one of ordinary skill in the art, that "would lead" that individual 'to combine the relevant teachings of the references.' ...

Accordingly, an examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done."

In the present case, there is no reason given in the Office Action on September 21, 2005, to support the proposed combination, other than the statements "There it would have been obvious to one of ordinary skill in the art to modify Graves et al. in view of Uesugi to incorporate a multiplier and three selectable multicarrier frequencies in order to obtain a frequency diversity effect." However, the fact that all of the prior-art references either in individual or any combination form is not sufficient to gratuitously and selectively substitute parts of one reference for a part of another reference in order to meet applicant's novel claims because there are fundamental differences between the applicant's invention of the dual-mode multichannel-based multi-carrier modulation system and Graves's analog lowpass filter, MUX units, commuter units, and switches, and Uesugi's multiplier and selectable multicarrier frequencies as well as any combination of Graves et al., and Uesugi as applicant discussed above.

Thus, applicant submits that the fact that the dual-mode UWB and WLAN communications produces advantages militates in favor of applicant because it proves that the present invention produces new and unexpected results and hence is unobvious.

As stated in the above Levengood case again:

“That one can reconstruct and/or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention.”

Therefore, applicant submits that individual or any combination form of Graves et al., and Uesugi is not legally justified and is therefore improper. Thus, applicant submits that the rejection on these prior-art references is also improper and should be withdrawn.

**Even If Graves et al., and Uesugi Were To Be Combined In The Manner Proposed, The Proposed Combination Would Not Show All The Novel Physical Feature Of Claim 24**

However, even if any combination of Graves et al., and Uesugi were legally justified, claim 24 would still have novel and unobvious physical features over the proposed combination. In other words, applicant's invention, as defined by claim 24, comprises much more than merely substitutes a plurality of templates to one template. Furthermore, there are fundamentally differences between applicant's invention of the physical feature structure and expected results, and any combination of Graves et al., and Uesugi. It is also clear that applicant's invention has novel and unobvious physical features over any prior-art references.

Thus, applicant submits that the present invention of the dual-mode UWB and WLAN communications is much more than merely substituting a plurality of templates for one template and that claim 24 clearly recites novel physical subject matter, which distinguishes over individual or any possible combination of Graves et al., and Uesugi.

**The Novel Physical Features Of Claim 24 Produce New And Unexpected Results And Hence Are Unobvious And Patentable Over These References Under Section 103.**

Applicant also submits that the novel physical features of claim 24 is unobvious and hence patentable under Section 103 since it produces new and unexpected results over Graves et al., and Uesugi or any combination thereof.

These new and unexpected results are the ability of applicant's invention of the dual-mode UWB and WLAN communication system for capturing the transmitted UWB signals existed in the entire frequency band from 3.1 GHz to 10.6 GHz and the transmission WLAN signals in the lower frequency band from 5.15 GHz to 5.35 GHz and in the upper band from 5.725 GHz to 5.825 GHz. Applicant's invention of the dual-mode UWB and WLAN communication system therefore is a novel and vastly superior to that of either Graves et al., and Uesugi or any possible combination thereof. The novel physical features of applicant's invention of the dual-mode UWB and WLAN communication system that affects these differences are, as stated, clearly recited in the claim 24.

**The Dependent Claims Are A Fortiori Patentable Over Graves et al, and Uesugi**

The new dependent claims from 25 to 27 incorporate all the subject matter of the new independent claim 24 and add additional subject matter that makes them a fortiori and independently patentable over these prior-art references. Accordingly, applicant submits that the new dependent claims are a fortiori patentable and should also be allowed.

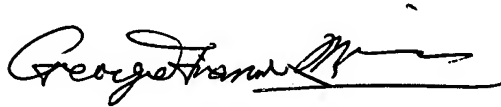
**Conclusion**

For all the reasons given above, applicant respectfully submits that the specification and claims are new in proper form, and that the claims all define patentable over the prior-art references. Therefore, applicant submits that this application is now in full condition for allowance, which action applicant respectfully solicits.

**Conditional Request For Constructive Assistance**

Applicant has amended the specification and the claims of this application so that they are proper, definite, and define novel physical feature structure, which is also unobvious. Therefore, this application is submitted that patentable subject matter is clearly present. If, for any reason this application is not believed to be in full condition for allowance, the applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. Section 2173.02 and Section 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



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Date: November 14, 2005

Inventor's Signature: 